DOCUMENT RESUME

ED 411 358 UD 031 892

AUTHOR Pisapia, John
TITLE Teaching with Technology: Roles and Styles. Research Brief #5.
INSTITUTION Metropolitan Educational Research Consortium, Richmond, VA.
PUB DATE 1994-05-00
NOTE 5p.; Research extracted from the technology studies by the Metropolitan Educational Research Consortium.
PUB TYPE Reports - Evaluative (142)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Computer Literacy; *Computer Uses in Education; Curriculum Development; *Educational Technology; Elementary Secondary Education; Inservice Teacher Education; Student Motivation; Teacher Attitudes; *Teacher Role; Teaching Methods; Technological Advancement
IDENTIFIERS Learner Centered Instruction

ABSTRACT

The impact of technology on teaching is explored. Technology alone cannot affect the ways in which teachers and students interact, but it can affect teacher roles in several ways. Teachers may feel that computers will replace them, or they may regard technology as just another tool. Some teachers believe that technology can transform curriculum, the teacher's role, and even school structure. In fact, technology can support traditional or learner-centered instructional philosophies, but teacher use of technology is generally influenced by their knowledge of the technology, access to instruction and support, and incentives that favor teacher use or disuse in the classroom. Teachers who do adopt a technology-based approach normally progress from being a presenter of knowledge to being a coordinator of learning resources, being freed to work individually with students. Technology can be a medium of instruction or it can be a tool in support of the goal of teaching for understanding. Teacher-centered teachers tend to use traditional instructional methods and to regard learning technologies as basic skill reinforcers, motivators, or special treats. Learner-centered teachers usually choose individualized or collaborative approaches to engage students. Learner-centered teachers may be high technology users, or they may be reluctant to use technology because of personal fears and inhibitors. For successful technology use, teachers must be flexible in the roles they play. (SLD)

TEACHING WITH TECHNOLOGY: ROLES AND STYLES

The relationship of technology and education is a viable one. It is most viable when thought of as a tool to facilitate and enhance activities.

(Honey & Moeller, 1990)

The purpose of this research brief is to examine the impact of technology, primarily the computer, on teaching roles and style. The research reported in the brief was extracted from the Metropolitan Educational Research Consortium's (MERC) technology studies.

Can technology improve instruction?

Technology alone cannot affect the ways in which students and teachers interact. Teachers are needed who are flexible in the roles they will play -- sometimes the lecturer, sometimes the tutor, sometimes poser of thought-provoking questions, sometimes diagnostician, always guiding.

How might technology affect the teachers role?

Three main "visions" of how technology might affect teachers' roles inform current discussion.

1. **Replacing**. At one end of the continuum, many teachers feel they will be replaced by computers. Indeed, many large computer management systems that are now marketed claim to "deliver" most of all of the content of a subject, and to keep track of student progress.

2. **Implementing**. The most common vision is that computers are just another tool for teachers to use, one that will supplement and enhance the curriculum but not change it significantly. With this approach, it would typically be used for unpleasant D&P and tutorials in various subjects, most notably mathematics and language arts.

3. **Transforming**. At the other end of the continuum, advocates insist that technology can help transform curriculum, teachers' roles and even school structure. The teacher's role is to facilitate learning rather than lecture. Students use the potential of technology to communicate, access information, learn collaboratively, think critically and take initiative in planning and implementing curricular products.

Do I have to change my instructional philosophy to use technology?

Technology can support either the **traditional or learner-centered instructional philosophies**. Traditional teachers use it as a **medium** for drill and practice and tutorials. Learner-centered teachers use it as a **tool** for problem-solving by taking advantage of the word processing, database, spread sheet, graphics and telecommunication applications. Technology enables teachers to reinforce their instructional philosophy or transform it.

What factors influence the teachers decision to use technology?

Three general factors influence teachers' decisions to use technology: 1) teacher's knowledge of appropriate uses of computers, 2) access to necessary resources and support, and 3) incentives that favor or discourage computer use in the classroom (Wiske, 1988).

Will my teaching style change if I use a technology-based approach?

Most observers feel there is no "best way" to teach or learn. Some people think both the teacher and learner-centered approaches have their places. The general consensus is that as a result of the adoption of technology, the teacher can be empowered to function as a facilitator of learning rather than acting in the traditional role as transmitter of ready-made information. However, it can support a teacher-centered style also. In either style, technology extends teachers, and does not replace them.

On the other hand, in some instances the teacher's role in the teaching and learning process can change as new technologies are introduced into the classroom. For example, in distance education, instruction is delivered by a teacher surrogate responsible for the major information presentation systematically through videotapes, audiotapes, computer programs, programmed textbooks, and combinations of media.

Teachers who adopt a technology-based approach normally progress from presenter to coordinator of learning resources, thus freeing them to work individually with students. They move from being the "sage on the stage" to the "guide on the side." These teachers thought the use of learning technologies shifted their teaching approach most. They often mentioned that learning technologies helped them vary the traditional picture of the teacher lecturing to the whole class. Computer technology in particular facilitates an approach in which students work on problems individually, or in small groups while the teacher circulates among them, serving as coach and facilitator and helping students move from memorization to inquiry.

How will technology impact my classroom?

Technology can impact classroom organization. The interaction that occurs within it can be impacted by the configuration of the technology and resource allocation.

Exemplary technology-using teachers **organize their classes** differently than other teachers. Surprisingly, they did not individualize assignments more. But they are less likely to have each student do identical assignments. They emphasize more small group work. They use smaller groups and different materials for different groups.

The standards and needs of exemplary technology-using teachers are larger than those of other users. These teachers cite not having enough space to locate computers properly, computers that are too limited, out of date or incompatible with other equipment, software that is not pedagogically sound, and difficulty keeping everything in working order (Becker, 1992).

Technology impacts the classroom by reorganizing **classroom interaction.** With some students engaged in computer work, teachers can give assistance to non-computing students, allowing computing students to work independently.

There is also some evidence that the introduction of technology empowers the interaction of students and teachers in learner-centered and teacher-centered instruction. For example, Bradley & Morrison (1991), found more interaction occurring in the laboratories than classrooms. Teaching and learning in computer-based classes was dramatically more student centered and individualized than in traditional classes. Patterns of interaction also varied across grade level as well as by activity structure. Additionally, students engaging in microcomputer-based instruction with a partner required less teacher assistance than did students working alone.

Locating computers in classrooms is a growing trend and appears to be important. The classroom location frees teachers to use them as needed. Labs, on the other hand, tend to be inaccessible and require scheduling. In one study of a school that located computers in labs, forty percent of teachers said they had no access for all students.

Currently, **resources** also seem to be **allocated differently** across grade levels. For example, elementary schools seem to prefer to distribute their computers. In spring, 1989, only seven percent of K-6 schools and twenty-four percent of the high schools had at least eight computers linked (Becker, 1991).

Location also might impact the degree of true **integration of computer** resources into the curriculum. For example, evidence exists that supports the position that problem-solving units be taught effectively in the classroom with just a few computers, rather than depending upon the now-common centralized computer laboratories? For instance, Sheingold et al. (1983) asserted that centralizing computers outside the regular classrooms helps avoid integrating them with the regular classroom. Yet, centralizing computers may be more cost effective.

Additionally, Herman et al. (1992) found that technology affects the social organization of classrooms. For example, when using technology, students tended to work in cooperative and/or collaborative groups. This pattern may result from the limited number of computers available to each student. However the use of technology does produce a higher incidence of cooperative learning activities. If these studies are correct, they are important keys for how to solve curriculum integration problems.

How can teachers use technology?

Learning technologies can be discussed in terms of two potential roles: as a **medium** or as a **tool**.

When teachers use learning technologies as a **medium**, they are treating learning as an ultimate goal. The technology serves to instruct or inform the user generally through drill and practice programs, tutorials, simulations, or educational games. Technology as a medium supports the goal of imparting knowledge. Used in this manner, it also supports the **traditional model** of education.

The traditional model has most often taken a didactic instructional approach. The teacher transmits knowledge to the students, who verify that they have learned by reiterating it on a test. In this model, the teacher tends to be teacher-centered.

When teachers use learning technologies as a **tool**, they are treating learning as an instrumental goal. Technology serves to help the user accomplish a task. The rationale for this approach is that learning technologies, especially computers, should be used the way they are used in society to empower their users as personal and educational productivity tools. Teachers can use them to write lesson plans, notes to students/parents, comment on student work, and keep track of student progress.

As a tool, the computer supports the "teaching for understanding goal," and the contemporary **constructivist instructional model**. In this model, the teachers tend to be learner-centered, they help students construct their own meaning and demonstrate their knowledge through performance-based assessment, such as portfolios and projects.

The following guiding visions support the "tool" role of technology.

1. Teachers need a work station linked via networks to student work stations in classrooms or labs, and a similar arrangement at home linked by modem to their school and other schools.

2. Students should have the opportunity to use computers to explore ideas, analyze data, write papers and stories, to receive and carry out written assignments, research using data bases, to design, compare, publish, plan and work with a team on a project. They should have the capacity to connect electronically to students in other schools, states, and countries.

How do teacher-centered teachers use technology?

Teacher-centered teachers tend to use traditional instructional methods -- whole class lecture, text books and worksheets. They are more content-oriented than process-oriented and see learning technologies as basic skill reinforcers, motivators or "special treats."

Teacher-centered teachers' goals for using learning technologies are rather traditional and uninspired. In fact, several studies indicate that low technology using teachers used **teacher-centered** approaches. These teachers were reluctant to use technology because a) it might alter the

relationship of control and authority with students, and b) mandates and requirements did not allow time for additional activities.

When teacher-centered teachers use technology, it is generally computer-assisted instruction (CAI). The computer provides a) drill and practice exercises but not new materials, or b) tutorial instruction that includes new materials (see taxonomy in Pisapia & Perlman, 1992). Drills and tutorials are found to be suited to teaching facts. Educators also allude to drill strategy as powerful in the development of intellectual skills, acquisition of verbal information, and development of cognitive strategies. Drill and practice can enhance mastery and performance and presents teacher-proof control of information.

Results from studies (see Pisapia & Perlman, 1992) agree that using the computer as tutor, or employing it as a supplement to traditional teaching is effective when judged by traditional assessment instruments. Specifically, using the computer as tutor can help students become more efficient and motivated and assist them in developing a positive attitude toward the technology.

How do learner-centered teachers use technology?

Learner-centered teachers generally chose individualized or collaborative approaches. They play down facts for an inquiry or discovery-based mode of learning. Their goal is to instill a sense of curiosity -- to get students to want to find things out. They engage students in projects and group-oriented activities.

Many teachers who have been using technology extensively, as well as those who expect to use it in their teaching, are interested in the potential of technology to support learning that is more open ended than drill and practice.

The literature portrays three types of technology-using teachers with learner-centered goals. First, there are the high technology-using teachers with learner-centered goals who used inquiry methods, collaborative learning, hands on experiences to stimulate the creative uses of the computer, and are process-oriented. For the most part they use tool-based software that enables students to undertake creative writing projects, publish newspapers, create magazines and explore math problems through spreadsheets.

Secondly, there are technology-using teachers with learner-centered goals who like to use technology, but cite that there are too many barriers. Either the equipment wasn't available, or there were problems scheduling time in the computer laboratory.

Finally, some learner-centered teachers are low technology users. They were reluctant to use technology because of personal fears and inhibitors.

John Pisapia

Phone: 804 828-1332
FAX: 804 828-0479
Internet: JPISAPIA@CABELL.VCU.EDU

Answers to questions found in this research brief have been synthesized from the MERC publications listed below. To obtain a copy, please contact the MERC office.

Pisapia, J. (1993, April). Learning technologies in the classroom: Case studies of technology intensive schools. 64 pp. ($8.50)

Pisapia, J., Schlesinger, J., & Parks, A. (1993, February). Learning technologies in the classroom: Review of the literature. 213 pp. ($10.00)

Pisapia, J. & Perlman, S. (1992, December). Learning technologies in the classroom: A study of results. 134 pp. ($8.50)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement (OERI)
Educational Resources Information Center (ERIC)

NOTICE

REPRODUCTION BASIS

☒ This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

☐ This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").